

1     What is claimed is:

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3     1.     A video file server for providing clients with video-on-demand access to movies,  
4     the video file server comprising:

5                 a cached disk storage system including a primary cache and disk storage for  
6     storing the movies; and

7                 a multiplicity of data mover computers coupled to the cached disk storage system  
8     for streaming video data from the cached disk storage system to clients in a data network,  
9     each of the data mover computers having a local cache;

10                wherein the movies are ranked with respect to popularity, and a respective set of  
11     the data movers are pre-assigned for servicing video streams for each movie ranking.

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13     2.     The video file server as claimed in claim 1, wherein the data movers in the  
14     respective sets of data movers are configured differently for providing more network  
15     interface resources for very popular movies and for providing more local cache memory  
16     resources for less popular movies.

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18     3.     The video file server as claimed in claim 2, wherein for very popular movies, the  
19     very popular movies are retained in their entirety in local cache of the data movers  
20     assigned to service the very popular movies.

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22     4.     The video file server as claimed in claim 1, wherein the sets of data movers  
23     include a set consisting of more than one data mover for servicing one very popular

1 movie, a set consisting of one data mover for servicing only one movie, and a set  
2 consisting of one data mover for servicing a plurality of the movies.

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4 5. The video file server as claimed in claim 1, wherein a series of at least some of  
5 the data movers include direct links for transfer of movie data from a data mover set  
6 servicing one movie ranking to a data mover set servicing a next higher movie ranking  
7 and for transfer of movie data from the data mover set servicing the one movie ranking to  
8 a data mover set servicing a next lower movie ranking.

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10 6. The video file server as claimed in claim 1, wherein data mover resources for a  
11 certain number of video streams from the data movers to the clients are reserved for each  
12 of a multiplicity of the movies.

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14 7. The video file server as claimed in claim 1, wherein the video file server is  
15 programmed for locking in the primary cache a plurality of entire movies, and when there  
16 is a need for servicing a more popular movie from the primary cache and there is  
17 insufficient free cache memory for servicing the more popular movie from the primary  
18 cache, transferring the servicing of a less popular movie from the primary cache to disk  
19 storage in order to free cache memory for servicing the more popular movie from the  
20 primary cache.

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22 8. The video file server as claimed in claim 7, wherein the video file server is  
23 programmed for freeing primary cache memory by transferring the servicing of a least  
24 popular movie in the primary cache from the primary cache to the disk storage so long as

1       no more than a certain number of video streams are being serviced concurrently from the  
2       least popular movie in the primary cache.

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4       9.       The video file server as claimed in claim 1, wherein the video file server is  
5       programmed for negotiating with a client for selection of an available movie during peak  
6       demand when resources are not available to select freely any movie in the disk storage  
7       for which a video stream can be started.

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9       10.      A video file server for providing clients with video-on-demand access to movies,  
10      the video file server comprising:

11            a cached disk storage system including a cache and disk storage for storing the  
12            movies; and

13            a multiplicity of data mover computers coupled to the cached disk storage system  
14            for streaming video data from the cached disk storage system to clients in a data network;

15            wherein the video file server is programmed for locking in the cache a plurality of  
16            entire movies, and when there is a need for servicing a more popular movie from the  
17            cache and there is insufficient free cache memory for servicing the more popular movie  
18            from the cache, transferring the servicing of a less popular movie from the cache to disk  
19            storage in order to free cache memory for servicing the more popular movie from the  
20            cache.

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22       11.      The video file server as claimed in claim 10, wherein the video file server is  
23       programmed for freeing locked cache memory by transferring the servicing of the least  
24       popular movie in the cache from the cache to the disk storage so long as no more than a

1    certain number of video streams are being concurrently serviced from the least popular  
2    movie in the cache.

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4    12.   The video file server as claimed in claim 10, wherein each of the data mover  
5    computers has a local cache, the movies are ranked with respect to popularity, and a  
6    respective set of the data movers are pre-assigned for servicing video streams for each  
7    movie ranking, and the data movers in the respective sets of data movers are configured  
8    differently for providing more network interface resources for very popular movies and  
9    for providing more local cache memory resources for less popular movies.

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11   13.   The video file server as claimed in claim 10, wherein a series of at least some of  
12   the data movers include direct dedicated links for transfer of movie data from a data  
13   mover set servicing one movie ranking to a data mover set servicing a next higher movie  
14   ranking and for transfer of movie data from the data mover set servicing the one movie  
15   ranking to the data mover set servicing a next lower movie ranking.

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17   14.   The video file server as claimed in claim 10, wherein data mover resources for a  
18   certain number of video streams from the data movers to the clients are reserved for each  
19   of a multiplicity of the movies.

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21   15.   A method of operating a video file server for providing clients with video-on-  
22   demand access to movies, the video file server having a cached disk storage system  
23   including a primary cache and disk storage containing the movies, and a multiplicity of  
24   data mover computers coupled to the cached disk storage system for streaming video data

1 from the cached disk storage system to clients in a data network, each of the data mover  
2 computers having a local cache, wherein the method includes:

3 ranking the movies with respect to popularity, and assigning a respective set of  
4 the data movers to each movie ranking, and

5 servicing video streams for each movie ranking with the respective set of data  
6 movers assigned for servicing said video streams for said each movie ranking.

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8 16. The method as claimed in claim 15, which includes configuring differently the  
9 data movers in the respective sets of data movers in order to provide more network  
10 interface resources for very popular movies and for providing more local cache memory  
11 resources for less popular movies.

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13 17. The method as claimed in claim 15, which includes, for very popular movies,  
14 retaining the very popular movies in their entirety in the local cache of the data movers  
15 assigned to service the very popular movies.

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17 18. The method as claimed in claim 15, which includes servicing a most popular  
18 movie with an assigned data mover set consisting of more than one data mover, servicing  
19 only one movie with an assigned data mover set consisting of one data mover, and  
20 servicing a plurality of movies with an assigned data mover set consisting of one data  
21 mover.

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23 19. The method as claimed in claim 15, wherein a series of at least some of the data  
24 movers are linked by direct dedicated data links and the method includes transferring

1 movie data from a data mover set servicing one movie ranking to a data mover set  
2 servicing a next higher movie ranking and transferring movie data from a data mover set  
3 servicing the one movie ranking to a data mover set servicing a next lower movie  
4 ranking.

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6 20. The method as claimed in claim 15, which includes reserving data mover  
7 resources for a respective number of video streams from the data movers to the clients for  
8 each of a multiplicity of the movies.

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10 21. The method as claimed in claim 15, which includes locking in the primary cache a  
11 plurality of entire movies, and when there is a need for servicing a more popular movie  
12 from the primary cache and there is insufficient free cache memory for servicing the  
13 more popular movie from the primary cache, transferring the servicing of a less popular  
14 movie from the primary cache to the disk storage in order to free primary cache memory  
15 for servicing the more popular movie from the primary cache.

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17 22. The method as claimed in claim 15, which includes freeing primary cache  
18 memory by transferring the servicing of a least popular movie in the primary cache from  
19 the primary cache to the disk storage so long as no more than a certain number of video  
20 streams are being concurrently serviced from the least popular movie in the primary  
21 cache.

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23 23. The method as claimed in claim 15, which includes the video file server  
24 negotiating with a client for selection of an available movie during peak demand when

1 resources are not available to select freely any movie in the disk storage for which a  
2 video stream can be started.

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4 24. A method of operating a video file server for providing clients with video-on-  
5 demand access to movies, the video file server having a cached disk storage system  
6 including a cache and disk storage containing the movies, and a multiplicity of data  
7 mover computers coupled to the cached disk storage system for streaming video data  
8 from the cached disk storage system to clients in a client data network, the method  
9 comprising:

10 locking in the cache a plurality of entire movies, and when there is a need for  
11 servicing a more popular movie from the cache and there is insufficient free cache  
12 memory for servicing the more popular movie from the cache, transferring the servicing  
13 of a less popular movie from the cache to the disk storage in order to free cache memory  
14 for servicing the more popular movie from the cache.

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16 25. The method as claimed in claim 24, which includes the video file server freeing  
17 locked cache memory by transferring the servicing of a least popular movie in the cache  
18 from the cache to the disk storage so long as no more than a certain number of video  
19 streams are being concurrently serviced from the least popular movie in the cache.

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21 26. The method as claimed in claim 24, wherein each of the data mover computers  
22 has a local cache, the method includes ranking the movies with respect to popularity,  
23 assigning a respective set of the data movers for servicing video streams for each movie  
24 ranking, and configuring the data movers in the respective sets of data movers differently

1 for providing more network interface resources for very popular movies and for  
2 providing more local cache memory resources for less popular movies.

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